

### THREE NEW SPECIES OF *CHAMAEDOREA* (ARECACEAE) FROM OAXACA, MÉXICO

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#### ABSTRACT

Three species of *Chamaedorea* Willd. (Arecaceae) from Oaxaca, México are described as new and compared with related taxa.

KEY WORDS: *Chamaedorea*. Arecaceae, new species, México.

Recent field work in México in support of a project on *Chamaedorea* to be published in 1990 by the International Palm Society, has yielded three undescribed species, all from Oaxaca.

***Chamaedorea rhizomatosa*** D.R. Hodel, *spec. nov.* Figure 1. TYPUS: México. *D.R. & R.J. Hodel 936* (HOLOTYPUS: BH; Isotypus: MEXU).

Subgeneris *Chamaedoropsis* Oersted. Species egregia caulibus caespitosis rhizomatibus, foliis pinnatis; species notata et bene distincta.

Stems cespitose by means of long rhizomes, forming well separated loose clusters of 6-12 erect or procumbent stems in area of ca. 4 square m, to 2.5 m tall, 7-9 mm diam., green, annulate, internodes 2-10 cm long. Leaves 3-6, erect-spreading, pinnate: sheath to 16 cm long, tubular, green, obliquely open apically, longitudinally striate nerved petiole 10-20 cm long, green and flat adaxially, light green and rounded abaxially with a light yellow band extending from rachis onto the sheath, longitudinally striate nerved; rachis 25-35 cm long, green and angled adaxially, pale and rounded abaxially, blade in outline 40-50 x 30-35 cm: pinnae 6-8 on each side of the rachis, lanceolate, slightly sigmoid, acuminate, contracted at the base, middle ones the longest, these to 25 x 5 cm, basal ones 14 x 2 cm, a prominently raised midrib and two slightly less prominent submarginal nerves adaxially, these yellowish abaxially, 3-5 secondaries between the midrib and each submarginal nerve, tertiaries



Figure 1. A clump of *Chamaedorea rhizomatosa* (D.R. & R.J. Hodel 936) grows on a steep, rocky hillside on the Pacific slope of Oaxaca.

numerous, faint apical pair of pinnae 13-17 x 5 cm with 5-7 primary nerves. 2-3 secondaries between each pair of primaries.

Staminate inflorescences straight, erect or horizontal; peduncle to 15 cm long, 4 mm wide at the base and there flattened. 2.5 mm diam. at the apex and there rounded; bracts 4, tubular, obliquely open apically, acute-acuminate, bifid, finely longitudinally striate nerved, prophyll 2-3 cm long, 2nd bract 6 cm long, 3rd 7 cm long, 4th 5 cm long, exceeding the peduncle and extending onto the rachis; rachis 5 cm long; rachillae 12, to 10 cm long, drooping. Staminate flowers borne spirally in moderately dense rows, 2 mm apart, globose in bud, 2 x 2.5 mm, = superficial but leaving elliptic scars 2.5 mm long; calyx cuplike, 1-1.25 x 2 mm, 3 lobed, lobes rounded, sepals imbricate basally; petals valvate, 2 x 2.5 mm, broadly ovate, acute, free apically; stamens in a fairly tight ring around and shorter than the pistillode, 1.25 to 1.5 mm long, filaments 1 mm long, anthers 0.75-1 mm long; pistillode columnar, 1.75-2 mm high,  $\pm$  equaling the petals, flared apically. Pistillate flowers and fruits not known.

Distribution: México. Oaxaca: moist pine-oak forest on steep and rocky substrate on the Pacific slope, 1400 m elev.

Specimens Examined: México. Oaxaca: beyond San Gabriel Mixtepec along the road from Puerto Escondido to Oaxaca, D.R. & R.J. Hodel 936 (HOLOTYPE: BH; Isotype: MEXU).

Normally I would be hesitant about erecting a species without seeing pistillate flowers or fruits. However, *Chamaedorea rhizomatosa* is sufficiently distinct from all other known taxa of *Chamaedorea* in its rhizomatous habit and pinnate leaves. Only *C. brachypoda* Standl. & Steyerf. and *C. stolonifera* H.A. Wendl. ex Hook. f. resemble the habit of *C. rhizomatosa* in their stems spreading by rhizomes and stolons respectively. However, both have simple and bifid leaves. *Chamaedorea rhizomatosa* is probably closest to *C. aequalis* Standl. & Steyerf. from the Pacific slope of Guatemala, from which it can be distinguished by its smaller and rhizomatous habit, fewer pinnae (8 versus 17) with more nerves and much smaller and fewer branched inflorescences.

***Chamaedorea foveata*** D.R. Hodel, *spec. nov.* Figure 2. TYPUS: México. D.R. & R.J. Hodel 939A (HOLOTYPE: BH; Isotypus: MEXU).

Subgeneris *Chamaedoropsis* Oersted. *Chamaedorea vulgatae* Standl. & Steyerf. affinis sed petiolis foveis confertis irregularibus notatis, segmentis nervis secundariis inconspicuis, floribus masculis immersis, calycibus humilibus differt.

Stem solitary, erect, to 1.5 m tall above a short curving subterranean portion. 3 cm diam., green, annulate, internodes 2-4 cm long. Leaves 3-5, spreading, pinnate, to 1.25 m long; sheath to 30 cm long, 2.5-4 cm diam., splitting deeply opposite the petiole to ca. half its length, tightly clasping completely



Figure 2. A pistillate plant of *Chamaedorea foveata* D.R. & R.J. Hodel 939B grows on the Pacific slope of Oaxaca. Note erect inflorescence.

in a tubular manner only in the lower half, dark green, minutely but conspicuously white spotted, thick, durable, longitudinally striate nerved when dry; petiole 20-40 cm long, robust, 1 cm diam., densely covered with minute irregular pits giving living material a rough texture and drying to narrow nearly elliptic contiguous fissures, green and very slightly flattened adaxially and only faintly grooved near the base, paler and rounded abaxially with a yellow-green band extending from rachis onto the sheath; rachis to 60 cm long, green and angled adaxially, pale and rounded abaxially; blade to 75 cm long; pinnae 12-16 on each side of the rachis, nearly straight, only slightly sigmoid, falcately acuminate, lanceolate, middle one the longest, these to 35 x 4.5 cm, 5 prominent primary nerves adaxially, 1 secondary between each pair of primaries in living material, secondaries inconspicuous adaxially when dry, tertiaries numerous, all nerves drying distinctly pale yellow abaxially, apical pair of pinnae 20 x 3.5-4.5 cm, basal pair 27 x 3.5-4.5 cm.

Inflorescences interfoliar but occasionally infrafoliar in fruit, erect, long pedunculate; peduncles to 85 cm long, 1.5 cm wide at the base and there flattened, 5-7 mm wide at the apex, light green and remotely white spotted where exposed at anthesis, orange in fruit; bracts 6, cylindric, tightly sheathing, acuminate, obliquely long open, green to brown at anthesis and minutely white spotted, longitudinally striate nerved, prophyll 8 cm long, 2nd bract 20 cm long, 3rd 30 cm long, 4th 38 cm long, 5th 35 cm long, 6th very short and rudimentary or to 15 cm long, equaled or exceeded by the 5th one. Staminate inflorescence with rachis 3 cm long, greenish yellow at anthesis; rachillae 8, to 25 cm long, spreading, greenish yellow at anthesis. Pistillate inflorescence with rachis 4-6 cm long, green or yellow-green at anthesis, orange in fruit; rachillae 3-7 or perhaps more, to 25 cm long, 5 mm diam. at base, 1-1.5 mm diam. at apex, stiffly erect, greenish at anthesis, orange in fruit. Staminate flowers borne spirally in four rows, 1-3.5 mm apart, dome shaped in bud, 2 x 2.5 mm, at anthesis globose, 2.5 mm diam., slightly immersed in elliptic depressions 3 mm long; calyx cuplike, 1 x 3 mm, not adnate to sides of pit, 3 lobed, sepals connate basally, thin, split to 0.5 mm, brown margined; petals valvate, ovate, free to the base, spreading slightly apically, acute, 2 x 2 mm, fleshy but thin and membranous when dry, not nerved or only obscurely so, margins thickened; stamens 1-1.25 mm long, filaments pale, slender, terete, 0.5-1 mm long, wider at base, awl shapes distally, anthers 1.5-2 x 0.5 mm, dorsifixed near the middle, sacs free and divergent at base; pistillode pale, columnar, 1.5-2 x 0.5 mm, exceeding stamens, shorter than petals, enlarged in middle, definitely barrel shaped, tip 3 lobed, flat. Pistillate flowers borne spirally in four rows, 2-4 mm apart,  $\pm$  globose, 3.5 mm diam., superficial or only slightly immersed in elliptic depressions 2.5-3 mm long; calyx cuplike, 0.5 x 3 mm, sepals as in staminate flowers; petals free nearly to the base and there briefly imbricate, broadly ovate, 2 x 2.5 mm, acute, yellow, very fleshy, thicker distally, faintly nerved when dry; 1-3 staminodes present; gynoeceium globose-ovoid,



2.5 x 2.5 mm, whitish, exceeding the petals, style short or lacking, stigma lobes recurved, blunt, fleshy, whitish.

Distribution: México. Oaxaca: moist pine-oak forest on a steep and rocky substrate on the Pacific slope, 1400-1900 m elev.

Specimens Examined: México. Oaxaca: N of San Gabriel Mixtepec along road from Puerto Escondido to Oaxaca, D.R. & R.J. Hodel 939A (HOLOTYPE: BH; Isotype: MEXU); 939B, 937 (BH, MEXU).

The epithet is taken from the Latin *fovea* meaning pit, in reference to the petioles being densely covered with minute but conspicuous, irregularly shaped depressions giving living material a rough texture. *Chamaedorea foveata* shares this unusual feature with *C. vistae* D.R. Hodel & N.W. Uhl from the Atlantic slope of Oaxaca. *Chamaedorea foveata* is easily distinguished, however, by being smaller in size and in all its parts, interfoliar inflorescences with fewer than 20 rather than up to 100 staminate rachillae, and yellow rather than orange flowers. *Chamaedorea foveata* appears closest to *C. vulgata* from the Pacific slope of Guatemala. It can be distinguished from that species by its pitted petioles, smaller but more numerous pinnae, with faint, nearly inconspicuous secondary nerves, and the staminate flowers immersed in the axis and with the calyx low, only about one-fourth that of the corolla.

*Chamaedorea queroana* D.R. Hodel. *spec. nov.* TYPUS: México. D.R. & R.J. Hodel 943B (HOLOTYPUS: BH; Isotypus: MEXU).

Subgeneris *Chamaedoropsis* Oersted. *Chamaedorea pumilae* H.

A. Wendl. ex Dammer affinis sed laminis tenuibus non coriaceis et corrugatis, foliis pinnatis, rachillis masculis erectis, floribus masculis viridibus differt.

Stem solitary, erect, appearing acaulescent but actually short, to 10 cm long, 2-3 cm diam., partially or wholly buried in leaf litter, covered with persistent leaf bases, internodes very short, 5 mm long, overall height of plant including leaves to 1 m but often flowering when 30 cm tall. Leaves 4-5, erect-spreading, 0.3-1.3 m long, regularly or variously and unevenly pinnate but occasionally flowering when simple and bifid, green, slightly mottled; sheath 7-14 cm long, obliquely long open, clasping completely in a tubular manner only near the base, green but pale along the apical margins, longitudinally striate nerved; petiole 15-70 cm long, dark green, minutely but conspicuously white spotted, flattened adaxially and grooved near the base, rounded abaxially; rachis 10-40 cm long if blade pinnate, to 10 cm long if simple and bifid, green and angled adaxially, green and rounded abaxially; blade thin, in outline to 50 x 25 cm if pinnate, to 25 x 18 cm if simple, bifid and incised apically to more than half its length with exterior margins slightly toothed toward the apex; pinnae to 10 on each side of the rachis, lanceolate, sigmoid, acuminate,



Figure 3. The plant from which the type specimen of *Chamaedorea queroana* was collected grows in wet forest on the Atlantic slope of Oaxaca. Note short inflorescences ascending from the base (lower center right).

the middle ones the longest, to 16 x 3-4 cm, contracted at the base, a prominent midrib flanked by two submarginal primary nerves. 1 secondary between each of these. tertiaries numerous. faint. apical pair of pinnae with 3 primary nerves. secondaries and tertiaries numerous, faint: if simple and bifid with 8-10 primary nerves on each side of the rachis, 2 faint secondaries between each pair of primaries. tertiaries numerous. inconspicuous.

Inflorescences infrafoliar, erect-arcuate, long pedunculate, peduncles to 50 cm long, stiff, straight, 5-7 mm wide at the base, 2-4 mm wide at the apex, greenish at anthesis where exposed, bright orange in fruit; bracts 6-9, tightly sheathing, acute-acuminate, bifid. longitudinally striate nerved, green to brown at anthesis, brown or fallen in fruit, prophyll 1-3 cm long, 2nd bract 1.5-5 cm long, 3rd 2.5-8 cm long, 4th 3.5-15 cm long, 5th 6-20 cm long, 6th 8-12 cm long, 7th 8-10 cm long, 8th 7-10 cm long and concealing rudimentary 9th that is 1 cm long. Staminate inflorescence with rachis to 10 cm long; rachillae 6-13, upright, basal ones the longest, to 18 cm long, apical ones to 15 cm long, all 1-1.5 mm diam.. pale green at anthesis. Pistillate inflorescence spicate or furcate, rachillae or flower bearing portion to 7 cm long, stiff, erect, white to pale green at anthesis and 1-1.5 mm diam., bright orange in fruit and 2.5-4 mm diam., longitudinally and finely striate angled when dry.

Staminate flowers 2.5-3 x 1.5 mm; calyx with sepals borne in a low thin cupule, lobes rounded. 0.5 mm high, split between sepals one-half their length; petals 3 x 1.5 mm, connate along basal two-thirds, white. tips free. open, green; stamens with filaments short,  $\pm$  triangular. fleshy basally, anthers 1 mm long; pistillode 2 mm long, slender, grooved. Pistillate flowers borne spirally and  $\pm$  densely in six rows, 2-3 mm apart,  $\pm$  ovoid, 2.5-3 x 2.5 mm. leaving superficial and rounded scars 1 mm wide; calyx when dry raised 0.25 mm above axis on a stalk 0.75 mm diam., explanate. 2 mm wide. shallowly 3 lobed, lobes 0.75-1 mm high, broadly rounded, membranous, sepals connate briefly at the base,  $\pm$  fleshy when fresh; corolla raised 0.5 mm above calyx on the central stalk, petals thick, fleshy, tough, apical half free. basal half imbricate, broadly ovate, 2.5-3 x 3 mm, acute, apex erect or slightly recurved. pale green tinged with dark green tips, tips brown adaxially, obscurely nerved when dry; one staminode present, toothlike; gynoeceum globose-ovoid. pale green, 1-1.25 x 0.75-1 mm, style short, 0.25 mm long, stigma lobes recurved, darkened. Fruits black, ovoid, 14 x 7.5 mm, tip pointed, fruiting perianth persistent with petals bright shining orange, conspicuous. fleshy, to 3 mm long with a prominent midrib and nerves abaxially.

Distribution: México. Oaxaca: dense, wet montane forest and cloud forest on the Atlantic slope, 1300 m elev.

Specimens Examined: México. Oaxaca: along México Hwy 175 from Valle Nacional to Oaxaca, D.R. & R.J. Hodel 943B (HOLOTYPE: BH; Isotype: MEXU); 943A (BH, MEXU); H.E. Moore, Jr. & G.S. Bunting 8914 (BH); T.B. Croat 48049 (MO).



CULTIVATION. United States. New York: Ithaca, in conservatory of L.H. Bailey Hortorium, Cornell University, grown from seeds from type locality. *H.E. Moore, Jr. & G.S. Bunting 8914 bis* (BH); *M.H. Stone 243* (BH); *R.B. Clark s.n.* (BH).

*Chamaedorea queroana* is named for Hermilo Quero-Rico, coordinator of the Arecaceae for the Flora Mesoamérica project and former Director of the Jardín Botánico, Universidad Nacional Autónoma de México. *Chamaedorea queroana* is quite distinct among Mexican members of the genus and actually appears closest to *C. pumila* from the wet Atlantic slope of Costa Rica. However, it is easily distinguished from that species in its generally much larger size, thin leaf blades not leathery or corrugated, pinnate leaves, rigid and erect staminate rachillae, and green staminate flowers.

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